The Rising Price of Medical Malpractice Insurance: Effects of State Legislative Responses

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I. INTRODUCTION

The medical malpractice "crisis" of the mid-1970s involved both a dramatic increase in premiums and a reluctance on the part of many companies to write medical malpractice insurance policies. Increased premiums and nonavailability of coverage in turn were perceived by the public and their elected representatives as potential sources of medical care cost inflation and possibly nonavailability of certain types of needed medical services. Virtually all states took some type of legislative action to ensure availability of malpractice insurance at a reasonable price. During the late 1970s, many of these new laws were tested in state courts.[1] Although the rate of premium inflation and availability problems had abated by the late 1970s, there were several predictions that these improvements were only temporary.[2]

To date, no one has isolated the effects of specific legislative actions on either the price or availability of malpractice insurance. It is now possible to gauge some short-term effects. Statutory changes potentially affect the frequency of claims, judicial determination in favor of either plaintiff or defendent, as well as the size distribution of settlements. Expected payouts of insurers, as well as projected administrative costs and profit margins in turn are reflected in premiums.[3] It is quite possible that legislative initiatives may have unintentionally fooled insurers by creating anticipations that settlements would fall when in fact this did not occur. Likewise, the publicity effect surrounding legislative activity may have caused the public and, for that matter, juries to become more cost conscious when in fact the direct constraining impact of the laws themselves was rather minimal. For policy purposes, these distinctions may be unimportant, even though, admittedly, there is less chance that the more purely

psychological reactions would repeat themselves in some future crisis.

Section II provides some background information on the malpractice insurance crisis of the mid-1970s. Section III describes specific legislative responses to the crisis at the state level. Empirical specification of premium regressions is provided in Section IV, followed by discussion of empirical results in Section V. The final section presents conclusions and implications for public policy.

II. BACKGROUND

There is substantial variation in malpractice insurance premiums--among physician specialties, across states, and over time. In the mid-1970s, premiums in a high risk specialty, orthopedic surgery, were about six times greater than those in lowest risk ("Class 1") specialties.[4] As an illustration of interstate variation in premiums within a specialty, premiums paid by orthopedic surgeons in 1974 varied from a high of $8,352 (New York) to a low of $479 (North Carolina), more than a 17-fold difference.[5] As discussed more fully below, both premium levels and annual percentage changes in premiums among specialties within a state are very highly correlated. Thus, this degree of interspecialty and interstate dispersion has been preserved since 1974. Over 1974-77, malpractice premiums almost doubled, following a three to four year period of relative calm; the 1977-78 change (the latest year available) was negligible.[6]

The reason for interspecialty variation in premiums is reasonably well-understood. Claims against physicians in surgical subspecialties in particular are much more frequent than in fields without a hospital orientation, such as general/family medicine and pediatrics.[7] Sources of interstate and intertemporal variation are much more complex.

Two published studies by economists have examined interstate variations in premiums and frequency of malpractice incidents. Using regression analysis with states as observational units for years 1970 and 1972, Reder (1976) related the premium of surgeons to four explanatory variables: (1) operations per surgeon; (2) nonfederal attorneys per capita population; (3) number of "key doctrines" favorable to plaintiff adopted by state; and (4) state per capita income. Only the third and fourth variables were statistically significant (and positive) at the five percent level or better. Per capita income measures at least two effects, both leading to a positive impact on premiums. Income is a likely determinant of the size of awards since higher income patients are subject to higher earnings losses. Also, more affluent patients can better finance legal expenses when the lawyer is paid on a fixed hourly rather than on contingency fee basis. The attorney availability variable was included as a measure of the price of attorney time; there is a strong conceptual case for including some type of attorney price measure in the equation. The role of operations per surgeon is much less clear. Since most suits may be traced to care rendered in the hospital and a high proportion to surgery in particular, there is reason for including a variable representing hospital and/or surgical activity.[8] However, a variable such as operations per capita population would have been more appropriate.

Feldman (1979) assessed differences in the number of malpractice incidents in 1970 per 1,000 state population. He included surgical operations per 1,000 population, per capita income, lawyers' earnings, variables representing 10 legal doctrines bearing on the processing or outcome of malpractice cases, and (in one regression) a measure of

defensive medicine as explanatory variables. Both the operations and income variables showed positive and statistically significant impacts on incidents. As expected, lawyers' earnings had a negative and statistically significant effect. A legal variable constructed as the sum of 10 individual binary (zero-one) variables showed that states with laws more favorable to plaintiffs have greater frequency of suits; however, when the individual legal variables were included as separate explanatory variables, few statistically significant parameter estimates were obtained. Feldman expected that "defensive medicine" would reduce the occurrence of malpractice claims. This result was not confirmed. On balance, Feldman's results suggest more definite roles for income, frequency of surgery, and lawyer price-availability than for legal doctrines as determinants of interstate variation in suits. Characterizing the nature of tort law by state at a given point in time in terms of its relative impacts on plaintiffs versus defendants, as opposed to changes in statutes, is extremely difficult, and measurement errors could be at least part of the reason for the legal variables' insignificance.[9]

Determinants of temporal change in malpractice activity and premiums encompass factors specialties and states have in common. These factors include technological change in the health field and rising patient expectations about what medical care can accomplish, loss of close provider-patient relationship with the rise in specialization, increased litigiousness of society, possibly actual changes in quality of medical care, changes in attitudes of juries toward welfare of plaintiffs versus concern for cost containment, and for premiums, in particular, performance of financial markets in which insurers invest. Taken as a

group, these factors may explain a secular growth in litigation and premiums better than the "crisis" in insurance availability and price.

There is no consensus as to why the crisis of the mid-1970s occurred, or, for that matter, why it passed. The industry justified substantial premium increases on grounds that they were losing money at their then-current malpractice insurance rates. However, profitability not only depends on loss ratios, but also on returns on investment of insurer reserves.[10] Clearly insurers suffered at least paper losses in the stock market during 1974-75, and this development may have been contributory. Critics of the insurance industry, such as Law and Polan (1978), have stated that with a few exceptions, such as New York and California, insurance companies in the mid-1970s were making decisions on the basis of events having little to do with their local situations. Law and Polan argued that the broad-scale panic was due at least in part to the actions of a single company, Argonaut, which had responded decisively to its adverse loss experience in several markets.[11] Rather than assessing their own situation, other companies simply panicked. According to this psychological view of the crisis, matters eventually settled after time allowed more objective assessments of the situation. Others have attributed the end of the crisis to fear of countersuits and lack of lawyer familiarity with the new state malpractice statutes if not the effects of the statutes themselves.[12]

III. STATE LEGISLATIVE RESPONSES

The crisis of the mid-1970s provided the impetus for numerous legislative proposals applying to causes of action alleging medical malpractice. Legislators assumed that if the legislative proposals could reduce the number and dollar amounts of malpractice awards,

insurers would be in a better position to predict recoveries, and therefore maintain coverage at reasonable rates and assure availability of malpractice insurance. Statutory changes were quite narrowly focused on medical malpractice. Many of these new laws were being tested in the courts as this decade of the 1970s ended.[13] This section briefly describes most of the major legislative changes, the effects of which are evaluated in terms of premiums below.[14] Legislative proposals are classified into (1) tort modification, (2) alternatives to trial, and (3) insurance provisions.

Tort Modification

1. Limitations on Provider Liability, Recovery by Plaintiff, and Patient Compensation Funds. Several states enacted laws placing a dollar maximum on the amount providers are required to pay in medical malpractice cases. A limitation on provider liability was often imposed in conjunction with a limitation on plaintiff recovery of a patients' compensation fund. A ceiling on either the provider's liability or plaintiff's recovery potentially shifts some costs of damages to plaintiffs. Conversely, to the extent that awards had been excessive heretofore, particularly for such subjective items as "pain and suffering," savings accrue to physicians and the public at large. Although these laws potentially reduce premiums, they will be successful only to the degree that settlements would have otherwise exceeded the ceilings and/or potential plaintiffs and especially their attorneys are discouraged by the fact extremely high settlements are curtailed and no longer sure. Unfortunately, data are not available for comparing the frequency distribution of settlements to the ceilings in states where they were enacted.

Patient compensation funds have been established to pay plaintiffs for damages incurred above the statutorially determined amount for which the provider is liable. These funds are typically supported by an annual surcharge assessed against the provider, with the surcharge being some stated percentage of the premium but set so as to reduce the relative burden on providers in high risk specialties. The main effect of such funds, if any, is likely to be on amounts of insurance (liability limits) purchased by providers rather than on the premium for a standard amount of coverage (such as a $100,000/$300,000 policy).

2. *Res Ipsa Loquitur*. The doctrine of *res ipsa loquitur* applies when a plaintiff can show (1) the event only occurs when someone is negligent, (2) harm was caused while the instrumentality causing the injury was exclusively controlled by the defendant, and (3) the plaintiff did not contribute to the injury.[15] In years immediately prior to 1975, courts in a number of states expanded applicability of the doctrine of *res ipsa*; they had increased effect of its applicability from an inference of guilt to a presumption, which, if not rebutted, would require a jury to reach a finding of guilty.[16] Since 1975, state legislation has delineated situations in which *res ipsa* can be applied (e.g., to foreign objects left in the body, radiation burns); in some states (e.g., Washington), the use of *res ipsa* in malpractice cases was virtually eliminated. Evidence from a recent study of medical malpractice claims indicates that *res ipsa* cases are moderately more successful in terms of percentages of cases won and are settled more rapidly, but the differences are not substantial.[17] Hence, limiting use of *res ipsa* may have some but probably not a dramatic effect on premiums.

3. Statute of Limitations. Statutes of limitations have received considerable attention in discussions of medical malpractice insurance.

One reason is the lengthy lag time which often occurs between the time an injury occurs and the date the claim is first made. This problem is particularly severe in this area since malpractice insurance has typically been sold on an "occurrence" basis. That is, the insurer protects the provider against any claim that may arise from an action taken by the provider during the policy year. Insurers have maintained that the persistent threat of a suit compels them to maintain substantial reserves, and, in any case, rate-setting is made more difficult.[18] Furthermore, there is empirical evidence that claims filed five years after the injury are more than twice as expensive as the average award.[19] State legislatures modified existing statutes of limitations to establish definite, presumably shorter, periods during which a medical malpractice action must be brought. However, the new limits contain exceptions, which, in addition to interpretations of state courts, could have important implications for the effectiveness of the new limits.[20]

4. Informed Consent. The doctrine of informed consent requires that a provider disclose information pertinent to the nature, purpose, and risks associated with a proposed medical treatment. Unfortunately, while the doctrine's intent is clear, in practice, whether patients were in fact properly informed has been determined on a case-by-case basis. During the mid-1970s, many experts held that ambiguity created by this doctrine was in itself a source of litigation, and several states codified the doctrine of informed consent to insure uniform definition and application.

5. Contingent Fee Regulation. It is often argued by physicians and others that payment of lawyers on a contingent fee basis for work on malpractice cases increases the total number of claims.[21] Assuming patients are risk averse, a plausible assumption for plaintiffs in

the aggregate, economic theory supports this assertion.[22] Unfortunately, there is no empirical evidence on this point. Since 1975, several legislatures have limited attorneys' fees in medical malpractice cases either by (1) empowering state courts to determine reasonableness of attorneys' fees, (2) fixing a percentage ceiling for contingent fees by statute, or (3) adopting a sliding scale which bases the contingency fee percentage on the amount of recovery. The latter two approaches, at least, have the potential of reducing lawyers' incentives to accept malpractice cases; the first is weakened by courts' reluctance to interfere with the attorney-client relationship.[23]

6. Collateral Source Provisions. The collateral source rule proscribes the application of benefits received by an injured party from sources other than the defendant as an offset to compensation due from the defendant. Hence a medical malpractice plaintiff may collect benefits substantially in excess of damages incurred. A number of states enacted legislation during the mid-1970s to limit such duplication of payments. Two types of laws have been enacted. One type permits introduction of evidence of payments received from collateral sources, allowing the jury to consider such evidence in determining the defendant's obligation to the patient-plaintiff; the other approach requires that there be an offset.[24] These changes have been controversial. Proponents of the collateral source rule have argued that the rule preserves patients' incentive to purchase insurance and the reduction in defendants' liability may reduce the deterrent effect of liability.[25]

7. *Ad Damnum* Clause. The *ad damnum* clause is part of the plaintiff's initial pleadings, stating amount of monetary damage incurred and the settlement requested. Although *ad damnum* may be seen as no more than an

initial asking price, it may influence the jury to award a larger settlement. More recent legislation eliminates *ad damnum*, but some laws now also require that the defendant be informed of the precise amount of recovery sought by the plaintiff during pre-trial discovery.[26]

8. Locality Rule. Historically, health care providers have been expected to render care consistent with the general standard of care in their community. Over time, because of improved communication and more uniform professional training, courts in many states have interpreted "community" quite broadly, encompassing regional if not national standards. There are two major reasons for dissatisfaction with this trend. First, many providers argue that this broad interpretation leads to the use of "hired guns"--providers who specialize in testifying on the plaintiffs' behalf. Second, adherence to regional and/or national norms may require that many physicians conform their practices to higher standards which in turn result in more costly care. Several states during the mid-1970s adopted local standard of care and/or expert witness rules to limit the use of national standards and/or witnesses.[27]

Alternatives to Trial

1. Pretrial Screening Panel. During the mid-1970s, more than half the state legislatures established pretrial screening panels to which cases must be submitted before they proceed to trial. Statutes vary substantially in terms of panel composition, procedural details, and admissibility of findings at subsequent trial. Virtually no other "reform" has elicited as much challenge in the courts as the concept of pretrial screening, principally because the panels are viewed as interfering with a plaintiff's right to jury trial.[28] Irrespective of the constitutional issues, there is some reason to believe that panels may not be effective in terms of reducing premiums. First, rather than

substitute for the jury trial, the panel may add another layer because many cases are not settled during the pretrial hearing. Second, although proceedings of the panels are less formal than a full-scale trial, substantial legal expenses may be incurred, especially in states where decisions are admissible at trial. Third, the existence of an informal and initially less expensive adjudication mechanism may in itself encourage filing of claims.[29]

2. Binding Arbitration. Binding arbitration differs from pretrial screening in that the decision of an arbitration board is final; unlike screening, arbitration is not followed by a jury trial. Proponents of arbitration argue that it reduces malpractice costs by resolving disputes in a less formal setting and before a panel of experts rather than a jury, which not only is nonexpert but subject to emotionalism. These contentions are debatable.[30] Although, in principle, arbitration may be compulsory or voluntary, no state to date has mandated compulsory arbitration, probably because of doubts about its constitutionality.[31]

Insurance Provisions

1. Joint Underwriting Associations. Enabling legislation for the establishment of non-profit joint underwriting associations (JUAs) has been passed in the majority of states, but implemented in only a few. A JUA is a pooling arrangement composed of commercial liability insurers with business in the state. All JUA statutes require that premium rates be on a self-sustaining basis. If losses occur, member companies may be assessed to cover the deficit. In some states, assessments may be recouped by subtracting the assessment due to the state from the premium tax or by instituting a surcharge on premiums paid by providers. JUA surpluses are to be used for premium reductions. Statutes normally

expire two or three years after enactment; depending on state statute, the JUA may be the exclusive carrier or compete with others.[32] In some states where JUAs are monopolists, they have been subject to criticism by doctors for their high rates.[33] JUAs may be a better solution for the malpractice insurance availability problem than for the cost problem.

2. Health Care Mutual Insurance Companies. A few states have recently enacted legislation authorizing creation of physician-owned and operated insurance companies. These firms assess physician members a one-time special charge (about one year's premium) which is refundable if the company succeeds.[34] Presumably since these mutual companies are run by physicians, they have a particular incentive to control premium increases.

IV. EMPIRICAL SPECIFICATION

Overview

The regression analysis is based on a time series of cross-sections covering the years 1974 through 1978 with the state as the observational unit. All continuous variables are expressed in logarithmic form; all binary variables enter linearly. Two alternative types of equations are specified: (1) premium levels, and (2) annual percentage change in premium levels. In the latter, the dependent variable is difference in the logarithm of premiums in a given specialty between year t and t - 1. This difference (multiplied by 100) yields a percentage change. When the premium equation is in difference form, the regressions span 1975-78 (annual changes for 1974-75, 1975-76, 1976-77, and 1977-78).

Dependent Variables

Dependent variables are premiums paid by physicians in three fields--general practitioners who do no surgery, ophthalmologists, and orthopedic

surgeons--deflated by a state price index that varies across states and over time (with 1967 = 1.0).[35] Premiums are for a "standard" policy offering $100,000/$300,000 coverage.[36]

Table 1 presents state means of premiums by year for the three groups of physicians. As seen in the table, premiums adjusted for cost-of-living differences peaked in 1976. The table shows that ophthalmologists' premiums grew relatively slowly. Nevertheless, premiums for various specialties in a state are highly correlated; pairwise correlations between general practitioner, ophthalmologists, and orthopedic surgeons are all 0.92 or higher; correlations between annual percentage changes in premiums in the three fields are also high, all 0.91 or higher. The correlations imply either that all the physicians in the state share the financial consequences of adverse experience of a few specialties or claim experience among specialties within a state tends to move together. The former is far more likely.

Explanatory Variables

The focus of the regression analysis is on the impacts of legislative changes on levels and rate of change in malpractice premiums. To isolate the impacts of legal influences on the dependent variables, it is necessary to control for a number of other factors.

Three control variables were also of the types included by Reder (1976) and Feldman (1979): per capita income (deflated by the state price index)--Y; surgical operations per 1,000 population--OPSPOP; and lawyers per 10,000 population--LAWPOP. In addition, the number of patient care physicians per 10,000 population--MDPOP--is included. Although a higher surgery rate may be expected to lead to a higher incidence of malpractice claims, a higher physician-population ratio may have the

opposite effect since patient access improves with increases in the physician-population ratio. More specifically, patients' office waiting time falls and the length of time physicians spend with patients rises.[37] Thus, even if medically defined quality is not altered, patients may feel better about their doctors.[38] As an alternative variable to MDPOP, a variable indicating physician availability in the specialty corresponding to the premium was entered as an explanatory variable; results were virtually identical to those shown below.

When premiums are expressed as levels, it is appropriate to control for the legal environment prior to the mid-1970s. As noted above, enactment of specific laws on malpractice is a development of the mid-1970s. Thus, prior to this time, the disposition of malpractice cases was to a large extent dependent on the nature of tort law in the state, as determined by the state legislature and judiciary. Initial regressions contained a legal variable as constructed by Feldman (1979), similar to Reder's (1976), and alternatively, a legal index based on parameter estimates from Feldman's regression with malpractice claims frequency as the dependent variable. Neither legal variable showed a discernible impact on premiums, once other explanatory variables were included.

An alternative approach is to include individual state binary variables. This approach introduces multicollinearity. However, without a measure of the legal environment prevailing over a substantial period of time, parameter estimates on variables depicting state legislative responses may be biased.

Variables depicting legislative responses to the malpractice crisis of the mid-1970s are shown in Table 2 from LRECOV through SELINS. The

variables assume the value one for the year a malpractice "reform" was enacted by the state legislature and for succeeding years and are zero otherwise with one exception. When a reform was subsequently overturned by judicial decision, the variable assumes the value zero in the year in which the decision was made and thereafter.[39] Correlations among the legislative change variables (shown in the appendix) are almost always positive and most often in 0.2 to 0.4 range. The highest correlation, not surprisingly, is between limitation on recovery and the patient compensation fund (0.63). Finally, time variables T74 through T77 represent time-related effects common to all states.

Several alternative specifications were explored in order to gauge the time phasing of responses to recent legislation and other explanatory variables, all using premium levels as the dependent variable. In one, a lagged dependent variable was included (Koyck lag specification). Results from these regressions imply that around 90 percent of the response to a change in an explanatory variable takes place in the year following the change, quite a rapid response. Alternatively, explanatory variables for both the current and the preceeding year were included in the same regression. The resulting parameter estimates were very unstable because of multicollinearity.

V. EMPIRICAL RESULTS

Table 3 presents regressions with premium level dependent variables. The first, second, and fourth regressions also contain individual state binary variables, not shown. The state binary variables should account for factors responsible for continued interstate differences in real premiums not explained by real per capita income (Y) through the physician-population ratio (MDPOP). If effective, legislative change variables

should demonstrate negative effects on real premiums. As seen in Table 3, there are more positive than negative signs on coefficients of variables LRECOV through SELINS. The most consistently statistically significant coefficients are for screening panels (SCREEN), arbitration (ARBIT), and to a lesser extent, mutual insurance companies (SELINS). But only the screening variable shows a negative impact on premiums. The fact that the regression results are quite similar for the three specialties is not surprising in view of the high simple correlations among premiums in the three specialties.

Table 4 presents regressions with annual growth in premiums as dependent variables. All of the regressions' explanatory power is in the time variables T75 through T77. These coefficients imply a rapid rate of premium inflation during 1974-75, 38 percent, 31 percent, and 45 percent for general practitioners, ophthalmologists, and orthopedic surgeons, respectively, higher than the inflation rate during 1977-78, which, as already seen, was negative. (Real premiums declined.) The legislative variables, viewed collectively, have no impact on premium inflation. In fact, excluding the time variables, the F-statistic for the equation never exceeds 0.63, far below conventional levels of statistical significance. Regressions including changes in control variables real per capita income through the physician/population ratio, not shown, are similar to those reported in Table 4.

VI. FURTHER DISCUSSION AND CONCLUSION

This study has considered several alternative sources of and solutions for the problem of medical malpractice premium inflation. Potential sources range from increased availability of attorneys, changing attitudes of juries, financial status of insurers, to the status of tort law in the states. Whereas many of the potential sources of premium inflation

were national in scope, most deliberate action was undertaken at the state level.

As discussed in this study, states instituted a number of statutory changes aimed at reducing premiums, or at least the rate of increase, and guaranteeing availability of malpractice insurance coverage. The empirical results give no indication that individual legislative actions, or actions taken collectively, had their intended effects on premiums.[40] It is possible that the publicity resulting from considerable legislative activity made juries and perhaps potential plaintiffs more aware of the cost consequences of malpractice suits. If it existed, this effect probably extended beyond the boundaries of any particular state.

Another possibility is that frequency of claims and size distribution of settlements in a state are only weakly related to premiums in the state. Unfortunately, state-specific data on claims frequency and the dollar amounts of settlements are not available for 1974 or thereafter. However, correlations between 1974 premiums, claims filed, cases won by plaintiffs, and mean size of awards for 1970 are surprisingly low (0.3 or less).[41] Certainly adverse insurer experience in a given year should be reflected in higher premiums in later years so that higher correlations were expected. There is a need for more "hard" empirical evidence on how insurers <u>really</u> set premiums.

Finally, lawyers are often held accountable for the increased tendency to seek legal recourse. Even though the lawyer variable is insignificant in regressions containing the state binary variables, the sign on the lawyer coefficients remains positive and substantial in size. Without the state binaries, the lawyer variable is significant at the one percent level. Viewing the empirical evidence in its

entirety, the notion that a 10 percent increase in the state lawyer/population ratio leads to almost a like percentage increase in premiums is a real possibility.

NOTES

[1]There are numerous accounts of legislative responses; a few studies document court decisions in this area. See, for example, Abraham (1977); American Arbitration Association (1976); American Medical Association, Office of the General Counsel (undated); American Medical Association, Public Affairs Division (1977a, 1977b, 1978); Baynes (undated); Carlin (1980); Editors of Duke Law Journal (1977); Jacobs (1977); Law and Polan (1978); Lipson (1976); Medical Liability Commission (1976); Medical World News (1977); Miike (1975); National Center for Health Services Research (1979); Redish (1977); Rhein (1976); Rosenberg (1980); Stromberg (1979); and Warren and Merritt (1976).

[2]Rosenberg (1979); Medical World News (1979).

[3]See especially All Industry Medical Malpractice Insurance Committee (1975) and Kendall (1978).

[4]Greenspan (1979), p. 66.

[5]Source: Unpublished data from Nancy Greenspan, Health Care Financing Administration; premiums are for a standard $100,000/$300,000 policy.

[6]See Greenspan (1979), p. 66 for 1974-77 trends. I have calculated the 1977-78 change. Pre-1974 data on premiums are available from Kendall (1978), p. 176.

[7]See, for example, U.S. Department of Health, Education, and Welfare (1978), Table 4-18 and Henderson (1978), p. 10.

[8]See, for example, Rudov, et al. (1973), p. 9, and U.S. Department of Health, Education, and Welfare (1978), several tables.

[9]Both Reder and Feldman took their legal variables from Dietz, et al. (1973).

[10]See, for example, Hastings (1975), All Industry Medical Malpractice Insurance Committee (1975), Munch (1978), and Law and Polan (1978).

[11]Law and Polan (1978), p. 171.

[12]See, for example, Rosenberg (1979).

[13]See, for example, American Medical Association (1978).

[14]More comprehensive summaries are provided in sources listed in note 1.

[15]See Editors, Duke Law Journal (1977) and Editors, Northwestern Law Review (1966).

[16]Editors, Duke Law Journal (1977), p. 252; American Medical Association (1977a), p. 7.

[17]U.S. Department of Health, Education, and Welfare (1978), p. V-7.

[18]All Industry Medical Malpractice Insurance Committee (1975).

[19]U.S. Department of Health, Education, and Welfare (1978), p. V-6.

[20]Exceptions are listed in Editors, Duke Law Journal (1977), pp. 254-255.

[21]See, for example, Dietz, et al. (1973) and American Surgical Association (1976).

[22]Feldman (1979).

[23]See Editors, Duke Law Journal (1977), p. 268.

[24]See American Medical Association (1977a), p. 4.

[25]Abraham (1977), pp. 504-505.

[26]American Medical Association (1977a), p. 2.

[27]For further discussion, see Abraham (1977).

[28]Recent court cases are listed in American Medical Association (1978). See Holder (1978), pp. 408-413, for a description of screening panels.

[29]Abraham (1977), p. 516.

[30]Abraham (1977), p. 517. Arbitration panels may in fact be more lenient. See Wadlington (1973). More favorable empirical evidence on cost-effectiveness of arbitration is presented in Heintz (1977). Arbitration has encountered opposition from trial lawyers. See Rosenberg (1980), p. 163.

[31]See Redish (1977), p. 768.

[32]See American Medical Association (1977a), p. 10.

[33]Rhein (1976), p. 75.

[34]See American Medical Association (1977a), p. 11 and Medical World News (1977), p. 23.

[35]The state price index is described in Sloan (1975).

[36]Premium data come from the Telephone Survey of Malpractice Insurance Companies conducted by the Health Care Financing Administration. See Greenspan (1979) for a capsule description of the survey. The first figure of the liability limit ($100,000 above) represents the annual limit per case; the second is the annual limit for all cases against the provider.

[37]Sloan and Lorant (1976, 1977) and Applied Management Sciences (1980).

[38]It is also true that utilization rates rise. To the extent that some "unnecessary" care is given, patients may be more likely to sue.

[39]Legislative change variables are based on sources listed in note 1 above.

[40]Many observers at the time were quite optimistic. See, for example, Welch (1975).

[41]The 1970 data were used in Feldman (1979). I am grateful to Roger Feldman for making these data available for this study.

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Table 1. Growth of Malpractice Premiums: State Means

Premium	1974	1975	1976	1977	1978	% Change 1974-76	% Change 1974-78
			Undeflated (current dollars)				
General practice	432	647	808	858	879	87.0	103.5
Ophthalmology	1,297	1,843	2,220	2,341	2,376	71.2	83.2
Orthopedic surgery	2,821	4,448	5,508	5,728	5,738	95.2	103.4
			Deflated (1967 dollars)				
General practice	294	403	475	475	451	61.6	53.4
Ophthalmology	889	1,149	1,310	1,300	1,225	47.4	37.8
Orthopedic surgery	1,913	2,763	3,246	3,178	2,958	69.7	54.6

Table 2. Explanatory Variable Definitions, Means, and Standard Deviations

Variable Name	Definition	Mean	Std. Dev.
Y	Real per capita income	3717.0	503.0
OPSPOP	Surgical operations per 1,000 population	0.0812	0.0164
LAWPOP	Lawyers per 10,000 population	12.4	11.7
MDPOP	Patient care physicians per 10,000 population	13.0	4.4
LRECOV	Limitation on provider liability	0.18	0.38
LLIM	Limitation on recovery by plaintiff	0.23	0.42
PTCOMP	Patient compensation fund	0.18	0.38
RESIPS	*Res Ipsa Loquitur*	0.22	0.41
ICON	Informed consent	0.32	0.47
CONFEE	Contingency fee regulation	0.27	0.45
SLIM	Statute of limitation	0.50	0.50
CSOUR	Collateral source provision	0.24	0.43
ADDAM	*Ad damnum* clause	0.40	0.49
LOCAL	Locality rule	0.22	0.41
SCREEN	Pretrial screening panel	0.40	0.49
ARBIT	Binding arbitration	0.17	0.38
JUA	JUA major insurer in state	0.06	0.24
SELINS	Health care mutual insurance company implemented	0.08	0.28
T74	Year = 1974	0.19	0.39
T75	Year = 1975	0.20	0.40
T76	Year = 1976	0.20	0.40
T77	Year = 1977	0.20	0.40

Table 3. Premium Level Regressions

Explanatory Variable	Dependent Variable							
	1. General Practitioner Premium		2. Ophthalmologist Premium		3. Orthopedic Surgeon Premium		4. Orthopedic Surgeon Premium	
Y	0.42	(0.66)	0.44	(0.70)	0.28	(0.34)	0.51	(0.71)
OPSPOP	1.016[c]	(0.60)	1.11[c]	(0.63)	-0.23	(0.44)	1.11[c]	(0.64)
LAWPOP	1.020	(0.80)	1.31	(0.85)	0.88[a]	(0.23)	1.04	(0.87)
MDPOP	-0.22	(0.87)	-0.49	(0.93)	0.25	(0.24)	0.17	(0.94)
LRECOV	-0.080	(0.088)	-0.027	(0.093)	0.019	(0.11)	-0.16	(0.09)
LLIM	0.046	(0.093)	0.046	(0.098)	0.11	(0.11)	0.024	(0.10)
PTCOMP	0.039	(0.10)	0.0005	(0.11)	0.11	(0.12)	0.046	(0.11)
RESIPS	0.001	(0.094)	-0.037	(0.010)	-0.088	(0.13)	0.052	(0.10)
ICON	-0.009	(0.085)	0.046	(0.090)	0.28[a]	(0.11)	0.022	(0.091)
CONFEE	-0.011	(0.100)	0.013	(0.11)	0.24[b]	(0.11)	-0.031	(0.11)
SLIM	-0.047	(0.072)	-0.020	(0.077)	0.016	(0.089)	0.0009	(0.078)
CSOUR	0.012	(0.094)	0.038	(0.099)	-0.15	(0.12)	-0.013	(0.10)
ADDAM	0.10	(0.087)	0.079	(0.084)	-0.15	(0.10)	0.13	(0.085)
LOCAL	0.18[b]	(0.08)	0.11	(0.089)	0.069	(0.11)	0.093	(0.090)
SCREEN	-0.19[a]	(0.07)	-0.19[a]	(0.071)	-0.16[c]	(0.09)	-0.15[b]	(0.072)
ARBIT	0.26[a]	(0.09)	0.29[a]	(0.096)	0.25[a]	(0.10)	0.18[c]	(0.097)
JUA	0.13	(0.11)	0.080	(0.12)	-0.099	(0.16)	0.11	(0.12)
SELINS	0.16[c]	(0.09)	0.048	(0.098)	0.31[b]	(0.14)	0.13	(0.10)
T74	-0.21	(0.17)	-0.13	(0.18)	--	(--)	-0.18	(0.18)
T75	0.074	(0.14)	0.063	(0.15)	--	(--)	0.15	(0.15)
T76	0.09	(0.11)	0.077	(0.11)	--	(--)	0.15	(0.11)
T77	0.065	(0.061)	0.070	(0.065)	--	(--)	0.090	(0.07)
Constant	5.16		6.37		4.69		6.63	
	R^2 = 0.87 F(69,166) = 16.4		R^2 = 0.84 F(69,166) = 12.4		R^2 = 0.36 F(18,217) = 6.9		R^2 = 0.86 F(69,166) = 14.6	

Notes: a = statistically significant at the 1% level (two-tailed test).
b = statistically significant at the 5% level (two-tailed test).
c = statistically significant at the 10% level (two-tailed test).

Table 4. Annual Change Regressions

Explanatory Variable	Dependent Variable					
	1. General Practitioner Premium		2. Ophthalmologist Premium		3. Orthopedic Surgeon Premium	
LRECOV	-0.010	(0.064)	0.0001	(0.069)	-0.040	(0.070)
LLIM	0.040	(0.066)	0.018	(0.072)	0.027	(0.072)
PTCOMP	-0.012	(0.071)	-0.0003	(0.079)	0.014	(0.079)
RESIPS	0.043	(0.077)	0.040	(0.085)	0.089	(0.085)
ICON	-0.056	(0.067)	-0.055	(0.073)	-0.057	(0.073)
CONFEE	0.0002	(0.06)	0.007	(0.071)	-0.018	(0.071)
SLIM	-0.006	(0.053)	0.019	(0.058)	0.012	(0.058)
CSOUR	0.007	(0.07)	0.030	(0.078)	0.018	(0.078)
ADDAM	0.050	(0.061)	0.039	(0.067)	0.053	(0.067)
LOCAL	0.032	(0.070)	0.012	(0.077)	-0.026	(0.077)
SCREEN	-0.071	(0.053)	-0.081	(0.058)	-0.044	(0.058)
ARBIT	0.11[c]	(0.06)	0.12[c]	(0.07)	0.074	(0.067)
JUA	0.034	(0.092)	0.026	(0.101)	-0.011	(0.10)
SELINS	-0.009	(0.082)	-0.065	(0.090)	-0.060	(0.090)
T75	0.38[a]	(0.07)	0.31[a]	(0.073)	0.45[a]	(0.073)
T76	0.19[a]	(0.06)	0.17[b]	(0.07)	0.21[a]	(0.07)
T77	0.064	(0.060)	0.069	(0.066)	0.076	(0.066)
Constant	-0.070		-0.075		-0.081	
	R^2 = 0.21		R^2 = 0.14		R^2 = 0.23	
	F(17,174) = 2.8		F(17,174) = 1.7		F(17,174) = 3.1	

Notes: a = statistically significant at the 1% level (two-tailed test).
b = statistically significant at the 5% level (two-tailed test).
c = statistically significant at the 10% level (two-tailed test).

Appendix Table Simple Correlations Among the Legislation Variables

	LRECOV	LLIM	PTCOMP	RESIPS	ICON	CONFEE	SLIM	CSOUR	ADDAM	LOCAL	SCREEN	ARBIT	JUA	SELINS
LRECOV	1.00	0.27	0.36	0.11	0.13	0.29	0.23	0.26	0.39	0.19	0.36	0.35	-0.02	0.10
LLIM		1.00	0.63	0.00	0.29	0.16	0.22	0.23	0.27	0.06	0.08	0.21	-0.01	0.08
PTCOMP			1.00	0.02	0.20	0.24	0.18	0.26	0.37	0.13	0.25	0.11	0.02	0.14
RESIPS				1.00	0.59	0.03	0.34	0.23	0.20	0.64	0.37	0.15	0.22	0.06
ICON					1.00	0.29	0.35	0.50	0.44	0.52	0.40	0.24	0.13	0.08
CONFEE						1.00	0.25	0.66	0.42	0.28	0.35	0.13	-0.07	0.26
SLIM							1.00	0.35	0.56	0.28	0.34	0.18	0.22	0.25
CSOUR								1.00	0.45	0.33	0.38	0.22	0.07	0.36
ADDAM									1.00	0.27	0.44	0.11	0.09	0.37
LOCAL										1.00	0.35	0.28	-0.00	0.14
SCREEN											1.00	0.19	0.24	0.31
ARBIT												1.00	-0.11	0.02
JUA													1.00	-0.07
SELINS														1.00

Appendix Wage Rates of Physician Employees

The 1976 and 1977 HCFA Surveys contain virtually identical questions on wages of non-physician employees of the practice. Physicians were asked to provide information on the number of non-physician employees by category, the total number of hours worked per week of employees in the category, and the total weekly salary for employees in the category. Categories are: (a) secretaries, bookkeepers, receptionists, or office managers; (b) registered nurses; (c) licensed practical nurses; (d) medical, X-ray or laboratory technicians or aides; (e) highly trained physician extenders (PEs) such as physician assistants and nurse practitioners.

These are difficult questions to answer, and initial examination of responses, revealing substantial variation in wages, confirmed this. The respondent is asked to refer to the preceding year, but both staffing and wages may vary substantially over the course of a year. Moreover, few practices would ever record wage payments and work hours by occupational group. This must have led to some rather quick (and inaccurate) calculations during the course of the telephone interviews (many of which lasted 30 minutes or less).

Our empirical analysis of wages paid by physicians' practices has involved these steps. First, data expressed in monetary terms were deflated by our area price index. Second, wage data from the HCFA Surveys were converted to hourly terms and screened for outliers.[1] Third, county-specific wage data were obtained from the Bureau of Labor Statistics. We requested information on employment and earnings of employees in these categories: service; health services; hospitals; and physicians' offices.

[1]The following screens were employed (numbers provided indicate range of valid cases: secretaries, $2-10; professional nurses, $2.50-$12.00; licensed practical nurses, $1.75-$8.00; laboratory technicians, $2.00-$12.00; physician extenders, $3.00-$20.00

Unfortunately, the BLS could not provide data on physicians' offices in machine-readable form. For this reason, we have taken county wages of hospital employees as a measure of the general wage level in the physician's market area. This variable may be expected to reflect area amenities as well as short-run differences in availability of health personnel. Further details on the hospital wage variable are provided below.

Table 1 presents wage regressions with real hourly wages in the five occupational groups as the dependent variable. In addition to the BLS hospital wage (also deflated), explanatory variables for Census Division, city size, and year are included. Excluded dummy variables are for practices in New England, the over five million SMSA category, and 1977. For 1976 survey observations, the BLS hospital wage is for first quarter 1977; for the 1977 survey, the BLS wage corresponds to first quarter 1978. This match is appropriate since each survey extended through April of the next year (e.g., for 1976, April 1977). The deflator reflects temporal as well as area price differences.

The regressions are disappointing on the whole. Even with a county-specific hospital wage variable, the R^2s range from 0.04 to 0.08, which is even low for a cross-section of micro observational units. Although statistically significant at the one percent level in four out of the five regressions, the coefficients are surprisingly small. The significant coefficients imply that a dollar increase in the hourly wage of hospital employees results in an increase in wages of non-physician employees of doctors of only $0.11 to $0.17 on average. Far larger area wage effects have been reported by others.[2] Some of the parameter estimates on the other variables are also surprising, but, with deflated wage variables, these results are not necessarily implausible.

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[2]See, for example, Frank Sloan and Bruce Steinwald, Hospital Labor Markets. Lexington, MA: D.C. Heath, 1980. The area price deflator is also explained in this book.

Table 1. Wage Regressions

Variable	Means and Std. Dev.		Wage Regressions									
			Secretary		RN		LPN		Lab. Tech.		PE	
Secretary wage	4.40	(1.31)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
RN wage	5.52	(1.55)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
LPN wage	4.31	(1.01)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
Lab. tech. wage	4.85	(1.60)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
PE wage	7.08	(3.21)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
New England	0.07	(0.25)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
Mid Atlantic	0.17	(0.38)	0.15[c]	(0.08)	0.35[b]	(0.16)	-0.19	(0.17)	-0.75[a]	(0.22)	1.94[b]	(0.75)
E. North Central	0.16	(0.37)	0.44[a]	(0.08)	0.47[a]	(0.16)	0.11	(0.16)	0.80[a]	(0.21)	1.77[a]	(0.67)
W. North Central	0.18	(0.39)	0.32[a]	(0.08)	0.62[a]	(0.15)	0.20	(0.16)	0.76[a]	(0.21)	1.98[a]	(0.66)
South Atlantic	0.05	(0.21)	0.30[a]	(0.10)	0.59[a]	(0.21)	0.10	(0.17)	0.68[a]	(0.23)	1.84[a]	(0.82)
E. South Central	0.07	(0.25)	0.07	(0.09)	0.22	(0.18)	-0.002	(0.17)	0.72[a]	(0.22)	1.10	(0.73)
W. South Central	0.08	(0.27)	0.41[a]	(0.09)	0.69[a]	(0.18)	0.12	(0.16)	0.81[a]	(0.22)	2.27[a]	(0.79)
Mountain	0.06	(0.23)	0.34[a]	(0.10)	0.61[a]	(0.19)	-0.015	(0.18)	0.78[a]	(0.24)	1.47[c]	(0.79)
Pacific	0.17	(0.37)	0.73[a]	(0.08)	1.05[a]	(0.17)	0.21	(0.17)	1.20[a]	(0.22)	2.00[a]	(0.69)
Non SMSA	0.19	(0.39)	0.26[a]	(0.07)	0.44[a]	(0.14)	0.30[a]	(0.13)	0.38[b]	(0.16)	0.74	(0.58)
Potential SMSA	0.02	(0.14)	0.30[b]	(0.13)	0.59[a]	(0.22)	0.02	(0.22)	0.62[b]	(0.30)	2.39[b]	(0.97)
50K to 499K SMSA	0.26	(0.44)	-0.05	(0.07)	0.13	(0.13)	0.05	(0.13)	-0.07	(0.16)	0.50	(0.54)
500K to 999K SMSA	0.10	(0.30)	-0.09	(0.08)	-0.09	(0.16)	-0.06	(0.15)	-0.09	(0.19)	0.47	(0.64)
1M to 4.99M SMSA	0.31	(0.46)	0.002	(0.06)	0.10	(0.13)	-0.09	(0.13)	0.09	(0.15)	0.05	(0.51)
5M + SMSA	0.12	(0.32)	--	(--)	--	(--)	--	(--)	--	(--)	--	(--)
Hospital wage	5.12	(0.91)	0.13[a]	(0.02)	0.17[a]	(0.04)	0.11[a]	(0.36)	0.16[a]	(0.05)	-0.24	(0.18)
1976 dummy	0.42	(0.49)	0.35[a]	(0.03)	0.47[a]	(0.07)	0.26[a]	(0.06)	0.53[a]	(0.08)	-0.20	(0.28)
Constant	--	(--)	3.22	(--)	3.74	(--)	3.50	(--)	2.93	(--)	6.28	(--)
			R^2=0.06 F(15,5512) = 25.0		R^2=0.08 F(15,2097) = 11.5		R^2=0.06 F(15,1285) = 5.3		R^2=0.07 F(15,1617) = 8.5		R^2=0.04 F(15,531) = 1.5	

Notes: Means and Standard deviations of explanatory variables are from secretary wage regression.
a=significant at 1% level (two-tailed test); b=significant at 5% level (two-tailed test); c=significant at 10% level (two-tailed test).

Table 1's regressions imply that there are two potential sources of measurement error: the HCFA surveys and/or the BLS wage measure. Although there are certainly inaccuracies in the latter, on balance, it appears to be the better of the two. Estimates of mean weekly, undeflated hospital wages by Census Division and year are presented in Table 2; standard deviations are in parentheses. The Census Division means and standard deviations are calculated from the physician practice observations. Hence, they reflect hospital wages paid in the areas in which HCFA Survey respondents are located. Patterns by Census Division and year appear reasonable. Means using the county rather than the physician as the observational unit are also shown in the table, as are the number of counties for which BLS released hospital earnings and employment data. For purposes of the regression analysis, we used Census Division means to fill in missing values. The hourly BLS wage variable was derived by dividing the weekly estimate by 36.

Table 2. Weekly Earnings of Hospital Employees: Data from Bureau of Labor Statistics

Census Division	No. of Doctors	1976		1977		1978	
New England	579	$163.10	(21.78)	$175.33	(20.77)	$189.77	(26.37)
Mid Atlantic	1,647	210.95	(60.04)	217.78	(47.05)	233.42	(44.10)
East North Central	1,303	172.32	(38.81)	178.28	(35.55)	186.60	(30.45)
West North Central	1,516	167.05	(27.09)	175.15	(24.78)	191.59	(27.40)
South Atlantic	348	140.37	(11.80)	148.15	(10.99)	162.43	(16.98)
East South Central	548	131.69	(27.69)	145.50	(25.93)	159.93	(26.77)
West South Central	619	136.36	(16.32)	149.17	(13.52)	169.60	(28.62)
Mountain	443	159.19	(29.18)	174.24	(32.55)	189.84	(52.98)
Pacific	1,342	186.55	(25.58)	196.74	(25.80)	218.28	(32.77)
All (doctor file)	8,345	$173.27	(44.09)	$182.49	(39.00)	$198.21	(41.36)
All (county file)		$135.71	(34.28)	$148.01	(38.42)	$153.35	(36.97)
No. of counties		1,281		1,287		1,989	